

This Page Is Inserted by IFW Operations
and is not a part of the Official Record

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

**As rescanning documents *will not* correct images,
please do not report the images to the
Image Problem Mailbox.**



(72) CESBRON, JEAN, FR

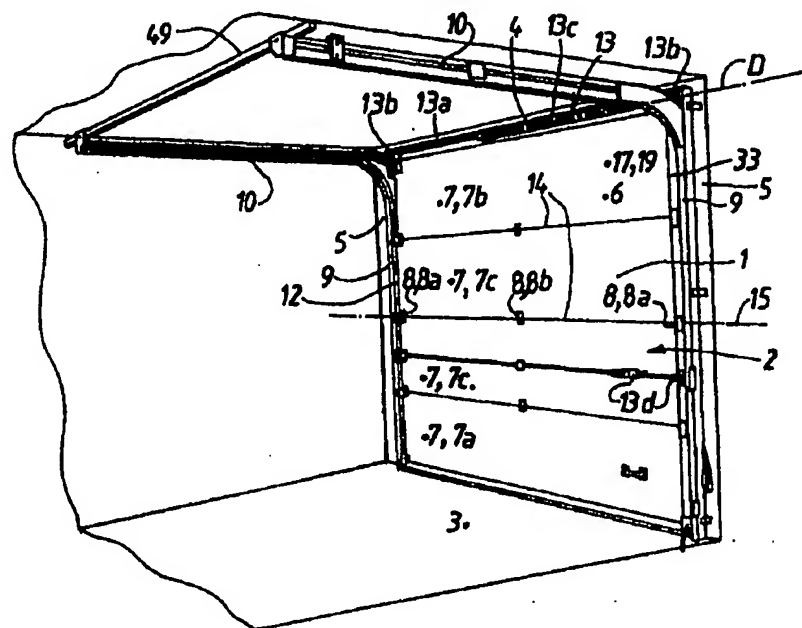
(71) NOVOFERM FRANCE, FR

(51) Int.Cl.⁷ E06B 3/48, E05D 15/38, E05D 15/24

(30) 1998/03/20 (98/03486) FR

(54) **PORTE SECTIONNELLE PRE-MONTEE PRE-REGLEE, ET SON
CONDITIONNEMENT**

(54) **PRE-ASSEMBLED AND PRE-ADJUSTED ROLL-UP DOOR, AND
FIXING**



(57) Porte sectionnelle (2) à effacement au plafond et débattement vertical pré-montée en vue de son installation comprenant un premier ensemble (6, 7, 9, 11, 13) incluant des rails de guidage latéraux (9), un vantail (6) comprenant une succession de panneaux (7) minces et légers comprenant un premier et un second parements (16, 17), un arbre (13a) disposé longitudinalement vers une extrémité des rails de guidage latéraux (9), un ou deux tambours (13b) d'enroulement de câbles, un ou deux câbles, un ou plusieurs organes élastiques de rappel (13c) pré-tendus montés sur l'arbre (13a), des moyens de manoeuvre (13d) du vantail, ledit premier ensemble (6, 7, 9, 11, 13) étant pré-monté et pré-réglé, en vue de l'installation de la porte; la porte comprenant en outre un second ensemble (10, 49) incluant des rails de guidage supérieur (10).

(57) The invention concerns a roll-up door (2) with ceiling retraction and vertical displacement pre-assembled to be installed comprising a first assembly (6, 7, 9, 11, 13) including lateral guide rails (9), a door leaf (6) including a series of thin light panels (7) comprising first and second sidings (16, 17), a shaft (13a) longitudinally arranged in the direction of one end of the lateral guide rails (9), one or two cable drums (13b), one or two cables, one or several pre-stretched return elastic members (13c) mounted on the shaft (13a), means for operating (13d) the door leaf, said first assembly (6, 7, 9, 11, 13) being pre-assembled and pre-adjusted for the door installation; the door further comprising a second assembly (10, 49) including upper guide rails (10).

ABSTRACT

5 The invention concerns a roll-up door (2) with
ceiling retraction and vertical displacement
pre-assembled to be installed comprising a first assembly
(6, 7, 9, 11, 13) including lateral guide rails (9), a
door leaf (6) including a series of thin light panels (7)
10 comprising first and second sidings (16, 17), a shaft
(13a) longitudinally arranged in the direction of one end
of the lateral guide rails (9), one or two cable drums
(13b), one or two cables, one or several pre-stretched
return elastic members (13c) mounted on the shaft (13a),
15 means for operating (13d) the door leaf, said first
assembly (6, 7, 9, 11, 13) being pre-assembled and
pre-adjusted for the door installation; the door further
comprising a second assembly (10, 49) including upper
guide rails (10).

Pre-assembled pre-adjusted sectional door
and its packaging

5 The invention relates to sectional doors which open against
the ceiling with vertical travel such as garage doors.

It more particularly relates to a door once manufactured,
pre-assembled and pre-adjusted on the one hand, once
installed in the construction for which it is intended on
the other hand; a packaging incorporating a number of pre-
10 assembled doors; and finally a construction incorporating an
assembled door.

Sectional doors which open against the ceiling and with
vertical travel such as garage doors are already known.

15 A known general structure of such doors is described
especially in the documents EP-A-666 401, WO-A-96/36 784,
EP-A-230 499, US-A-3 311 159, FR-A-2 304 756, FR-A-2 244
068, US-A-2 083 467, US-A-3 160 200 and US-A-4 472 910.

Documents EP-A-304 642, EP-A-370 324 and EP-A-370 376
20 discuss the structure of the longitudinal edges of two
adjacent panels.

The garage doors under consideration are intended to be installed in a structure which comprises an opening which the door is intended to block. The overall dimensions of the door (horizontal width and vertical height) are for this purpose greater than the dimensions of the opening in question.

The structure generally comprises a ceiling and two walls on each side of the opening defining the apron of a lintel and corner pieces of appreciable dimensions to left and right respectively.

The apron of the lintel is necessary as the result of the presence at this point of rails, a spindle supporting cable reel drums, and one or more components for retraction of the leaf. As to the corner pieces, they are necessary to house roller spindles, rollers and side rails.

The known doors previously considered are stored, delivered and supplied in a number of separate parts. The builder must assemble these pieces on site and provide adjustment. These operations are necessarily long and costly. Furthermore the adjustment can turn out to be less than optimal.

The object of the invention is in particular to limit the height of the apron of the lintel and the width of the corner pieces, and the time taken for assembly and adjustment on the construction site.

Consequently, for a given opening, it is possible to use a smaller door than previous doors. Or, conversely, for a given door, the opening can be larger. In addition, the storage, delivery, supply and installation (assembly, mounting, adjustment) are easier, take less time, more compact in volume and less costly.

Another object of the invention is a door which does not have the disadvantages of those now known, which is simple but at the same time strong and easy to make use of.

5 According to a first aspect, the invention relates to a sectional door opening against the ceiling and with vertical travel, such as typically a garage door, pre-assembled with a view to its installation, suitable thus to be stored, delivered and supplied on the installation site, comprising a first assembly including:

- 10 - side guide rails positioned vertically when the door is installed in place
- a leaf comprising a series of panels and supporting rollers cooperating with the side guide rails, each panel capable of being mounted on at least one other analogous
- 15 panel so that they swivel with respect to each other around an axis parallel to a longitudinal direction normally horizontal when the door is mounted in position, each panel, thin and light, comprising a first and a second facing made from thin sheets of metal or similar, the space closed at
- 20 the periphery by the two facings being at least partly filled with a synthetic material expanded during manufacture
- a shaft positioned longitudinally towards one end of the side guide rails
- one or two cable reel drums key mounted on the extreme
- 25 parts of the shaft towards the outside of the leaf and between the leaf and the side rails
- one or two cables connected on the one hand to the leaf of the lower end panel, on the other hand wound on to the cable reel drum(s), so that these cables are not subject to
- 30 unauthorised access
- one or more pre-stretched resilient return means mounted on the shaft, such as a spiral spring
- manual or motorised means for manoeuvring the leaf;

the said first assembly being pre-assembled and pre-adjusted with a view to the installation of the door;
the door comprising in addition a second assembly including upper guide rails.

5

The mass of each thin, light panel of the leaf is of the order of 9 to 10 kg/m², more particularly about 9.5 kg/m².
The total thickness of each thin, light panel is less than 3 cm.

10

In one embodiment, the second assembly comprises a crosspiece intended to connect the upper guide rails when the door is installed. According to another characteristic, the second assembly is placed flat against the leaf of the first assembly, the two assemblies forming a package.

15

According to a second aspect, the invention relates to a packaging for such a door which includes a support forming a pallet and rack capable of housing a number of doors placed side by side.

20

The support comprises two side flanks to which are removably fixed the side guide rails, and if appropriate:

25

- two flat iron bars to which are removably fixed the side guide rails at the other end of the flanks
- and/or a metal profile removably fixed under the side guide rails enabling each door to be protected during transport and the distance between the side flanks to be maintained.

30

This packaging can contain up to nine doors.

According to a third aspect, the invention relates to a method for positioning in a structure provided with an opening of a door opening against the ceiling and with

vertical travel, the said door being manufactured, pre-assembled and pre-adjusted, if appropriate packaged as indicated above, in which the said manufactured, pre-assembled and pre-adjusted door is brought on to the site of the structure where the first and second assemblies are positioned and fixed to the said structure.

According to a fourth aspect the invention relates to a sectional door opening against the ceiling and with vertical travel such as a typical garage door, intended to be installed in the opening of a construction, comprising:

- side guide rails and upper guide rails;
- a leaf comprising of a series of panels and supporting rollers, each panel being capable of being mounted on at least one other analogous panel so that they swivel with respect to each other around an axis parallel to a longitudinal direction normally horizontal when the door is mounted in place, each panel, thin and light, having a first and a second facing made from thin sheets of metal or similar, the space closed at the periphery by the two facings being at least partly filled with a synthetic material expanded during manufacture; the rollers being intended to cooperate with the side and upper rails to guide the leaf correctly;
- a shaft disposed longitudinally towards the connection of side rails and upper rails
- one or two cable reel drums mounted on the extreme parts of the shaft towards the outside of the leaf and between the latter and the side rails;
- one or two cables connected on the one hand to the loser end panel and on the other hand wound on to the cable reel drum(s);
- one or more resilient return means mounted on the shaft, such as a spiral spring;

-and manual or motorised manoeuvring means.

Thanks to the smaller weight of the leaf, it is possible to have drums of reduced diameter, such as between 65 and 75 mm.

- 5 Finally, according to a fifth aspect, the invention relates to a structure comprising an opening in which is installed a door such as has just been described.

10 The structure is such that the apron of the lintel and the corner pieces are of reduced size, possibly less than 10 cm, especially of the order of 8 cm and of the order of 9 cm respectively.

In the structure considered, the upper guide rails and the hinges are situated on the inner side and the longitudinal ribs on the outer side.

- 15 The invention will be better understood thanks to the following description with reference to the appended drawings in which:

20 Figure 1 is a perspective diagrammatic view of the inner side of a structure including a door according to the invention, shown closed;

- Figure 2 is a view in elevation of the leaf of the door of figure 1, on a larger scale, from the inside;

- Figure 3 is a view in elevation of a panel of the leaf of figure 2, on a larger scale, from the outside;

- 25 - figure 4 is a diagrammatic sectional view of the panel of figure 3 along the line IV-IV;

- figures 5a and 5b are two diagrammatic sectional views of the two facings, respectively outer and inner, of a panel;

- figures 6a and 6b are two partial diagrammatic views, on a larger scale, of figures 5a and 5b, showing the foldings of the facings;
- figure 7 is a partial sectional diagrammatic view, along a vertical plane, on a larger scale, of two panels in the same plane, showing more especially their longitudinal edges; figure 7a is an analogous view of a variant of this embodiment;
- figure 8 is a view analogous to that of figure 7, the two panels here being in their extreme relative swivelled position - not in the same plane - corresponding to the open door;
- figures 9 and 10 are two diagrammatic views similar to figures 7 and 8 showing the panels with their end hinges;
- figure 11 is a perspective view showing an end hinge with its spindle and roller;
- figure 12 is a front view of door packaging according to the invention;
- figure 13 is a side view of the packaging of figure 12 ;
- figure 14 is a front view of a pre-assembled door comprising two assemblies forming a package.

In the figures is shown a structure having an opening 1 for which the door 2 is intended.

The opening 1 is typically that giving passage to a motor vehicle, the door 2 thus being a garage door.

3 designates the floor, 4 designates the apron of the lintel, and 5 designates the corner pieces on each side.

According to the structural measures considered, the apron 4 of the lintel and the corner pieces 5 are of reduced size with respect to those of the state of the art.

For example, in one embodiment, the sizes are less than 10 cm and specifically substantially 8 cm for the apron of the lintel and 9 cm for each corner piece.

The door 2 comprises a leaf 6, mobile between a closed position (figure 1) and an open position.

In the closed position, the leaf 6 is positioned vertically or substantially vertically within the opening 1.

In the open position, the leaf 6 is positioned horizontally or substantially horizontally towards the ceiling next to the apron 4 of the lintel.

The door 2 considered is thus of the type that opens against the ceiling with a vertical travel. It is further of sectional type, the leaf 6 comprising a series of panels 7 similar or identical to one another. Two adjacent panels are arranged and mounted one on the other in such a way as to be associated together by pivoting means 8.

The door 2 also comprises side guide rails 9 and upper guide rails 10. These rails are respectively positioned vertically or substantially vertically, horizontally or substantially horizontally. They are positioned inside the structure, respectively on each side of and above the opening 1. They are situated near the opening 1. The rails 9 and 10 form two assemblies, one on each side of the opening 1. Each of these two assemblies includes one or two side rails 9 and one or two upper rails 10, the latter being adjacent to the extreme upper parts of the side rails 9. The two assemblies of rails 9 and 10 are positioned in two mutually parallel vertical

planes, perpendicular to the plane of the opening 1. The rails 10 are more particularly fixed to the ceiling.

5 D designates a horizontal direction situated in the plane of the opening 1, perpendicular to the plane of the two assemblies of rails 9 and 10.

10 Rollers ~~11 with axis D~~ cooperating with the rails 9 and 10 are supported by the panels 7 protruding from their vertical side edges 12. The rollers 11 can slide in the rails 9 and 10 to allow the movement of the leaf 6 between its open and closed positions.

15 The door 2 also comprises, in the embodiment considered a mechanism 13 including a shaft 13a with axis D positioned towards the junction of the rails 9 and 10 - and therefore towards the upper end of the rails 9 -, two cable reel drums 13b key-mounted on the extreme side parts of the shaft 13 towards the outside of the leaf 6 and between the latter and the side rails 9; two cables connected on the one hand to the lower end panel of the leaf 6, on the other hand wound on to the cable reel drums 13b; one or more resilient return components 13c mounted on the shaft 13a, such as a spiral spring; manoeuvring means 13d, in this case manual means, such as a handle controlling a latch cooperating with a catching hole provided in the doorframe 2.

25 The cables are positioned vertically or substantially vertically between the side edges of the leaf 6 and the rails 9. They are positioned in the immediate vicinity of the plane of the opening 1. They run between this plane and the roller supports 11. They are therefore not subject to unauthorized access.

30 The panels 7 comprise a lower end panel 7a, an upper end panel 7b and one or more intermediate panels 7c. In the

embodiment of figure 1, the leaf 6 includes in all of four panels 7, which are identical.

5 The panels 7 in front elevation have a rectangular general outline, the longer side being horizontal in the direction D and the shorter side being vertical (when the door 2 is installed and closed).

A panel 7 is delimited by the two side edges 12 and the two longitudinal edges 14.

10 Where appropriate the free longitudinal edges 14 of the panels 7a and 7b have associated with them a sealing gasket, a sensor bar or other appropriate devices.

The longitudinal edges 14 have in transverse cross section a profile of generally pseudo-triangular shape.

15 Two adjacent panels 7 are associated so as to swivel with respect to each other around an axis 15 parallel with the direction D. They have two longitudinal edges which substantially match each other, i.e. a so-called protruding (male) edge 14a and a so-called recessed (female) edge 14b.

20 In the embodiment considered, the protruding edges 14a are, when the door is installed and closed, facing upwards and in the upper position. And, conversely, the recessed edges 14b are facing downwards and in the lower position. A panel 7 thus includes, at the top, a protruding edge 14a and at the bottom a recessed edge 14b.

25 The protruding edge 14a has a general shape with concavity turned towards the inside of the panel 7. The recessed edge 14b has a general shape with the convexity turned towards the inside of the panel 7.

The protruding edge 14a and the recessed edge 14b will be described hereunder with reference to the association of two panels 7 in which these edges are contiguous.

5 A panel 7 comprises a first and a second facing respectively 16 and 17, defining its large visible outer faces 18 and 19, which are parallel. The facings 16 and 17 are made from thin metallic sheets, rigidly made solid one with another. In particular, the facings 16 and 17 are made from steel sheets of a thickness of the order of 0.4 mm.

10 The two facings 16 and 17 are, in this embodiment, made from the same type of thin leaf.

Depending on the embodiment, the two facings 16 and 17 are made from different types of sheets. The sheets of facings 16 and 17 may be made from material other than steel,
15 provided that this material is appropriate to the required use and performance.

The first facing 16 is the one situated on the outside of the structure, i.e. towards the visible "show" face 18 of the door 2. The second facing 17 easily seen in figure 1 is
20 situated on the inside of the structure (face 19).

At least one of the facings - in this case the first facing 16 - includes at least one longitudinal hollow stiffening rib 20 extending between the two edges 12. The other facing 17, in this embodiment has no such channel and is
25 substantially flat. In the embodiment illustrated, the longitudinal rib 20 extends across the whole distance between the two edges 12. According to another embodiment the rib 20 extends only across a part of this distance.

The longitudinal rib 20 has, as a transverse cross section,
30 an substantially triangular or rounded profile.

The facing 16 includes, in the embodiment illustrated corresponding to a panel 7 of appreciable width, several longitudinal ribs 20. These are of identical or nearly identical profile. The ribs 20 are essentially situated in the central zone of the panel 7, distant from the edges 14. They are at least substantially equidistant from one another. In the embodiment considered in which the door 2 comprises 4 panels 7, each of the latter has five longitudinal ribs 20.

The internal space 56 of the panel 7, closed at the periphery by the two facings 16, 17, is filled - at least partially - with a synthetic material which expand during the manufacturing process.

In addition, the panel 7 has no internal reinforcement or insert for substantial stiffening

A longitudinal edge 14 is of thickness which decreases continuously from the large faces 18, 19 to its longitudinal free edge 21.

The edge 14 is essentially defined by a number of successive substantially flat faces of one of the facings, in this case the outer facing 16 having the longitudinal rib or ribs 20.

More especially, the edge 14 is defined by at most four faces (two faces in the embodiment illustrated) and a rounding forming the longitudinal free edge 21.

For the protruding edge 14a, these two faces are, starting from the first large exterior face and as regards the facing 16, a face 22 having a greater width followed by a face 23 of smaller width, the latter being followed and terminated by the rounding of the edge 21 connected with the second internal large face 19.

For the recessed edge 14b, these two faces are, starting from the first large exterior face 18 and as regards the facing 16, taking into account the rounding of the edge 21, a face 24 of smaller width and a face 25 of greater width
5 connected with the second internal large face 19.

The facing 16 is folded and rolled to form the faces 22, 23, 24, 25 and the rounded edges 21.

At least one face 26 of the rib 20 has, with respect to the first outside large face 18 of facing 16, in the embodiment
10 considered, an inclination analogous or close to that of face 22 of the protruding longitudinal edge 14a.

In addition, in this embodiment, the profile of the rib 20 is analogous or close to the profile formed by the two adjacent longitudinal edges of the two adjacent panels 7
15 which are associated and in the same plane. This latter profile is in this case formed by part of the face 22 of one of the panels 7 and the rounding 21 opposite the other panel.

A panel 7 has a total thickness less than 3 cm.

20 The total mass of a panel according to the structure described may be of the order of 9 to 10 kg/m², in particular close to 9.5 kg/m².

However, despite this lightness, the rigidity of the panel to bending is excellent.

25 This result can be achieved even when the facings 16 and 17 have no substantially stiffening rib, channel or protrusion extending in a transverse direction.

However, it would be possible to provide for one or more transverse stiffening ribs, channels or protrusions.

Thus it would be possible for the facing 16 to be provided with longitudinal ribs 20 and also provided with at least one - and if appropriate more than one - transverse hollow ribs, with a profile analogous or close to that of a longitudinal rib 20, the panel being of the so-called cassette type.

Such cassettes typically are patterns stamped on the exterior facing, forming reliefs having a rectangular or non-symmetrical shape, and being slightly recessed on their inner surface and surrounded with a peripheral border.

In one embodiment, the depth of a longitudinal rib 20 is of an order of magnitude of one third of the total thickness of the panel 7.

The two sheets forming the facings 16 and 17 are rigidly made solid with each other towards each of the edges 14 by a fold with interleaving 27.

This fold 27 is flat and substantially in the same plane as one of the large faces of the panel 7, in this case the second internal large face 19, on the side of the facing 17. In this embodiment, the fold 27 is thus situated on the side opposite (i.e. facing) the first large face 18 which has the longitudinal rib(s) 20.

The fold 27 is obtained by means of a fold 28 in one direction of the facing 16 and a fold 29 in the other direction of the facing 17, the two folds 28, 29 being interleaved one in the other like a hook (figures 5a, 5b, 6a, 6b).

The fold 27 is situated, as regards the protruding edge 14a substantially opposite the ridge 30 formed by the first inclined face 22 of the edge on the first opposite large face 18. As regards the recessed edge 14b, the fold 27 is

situated close to the ridge 31 formed by the first inclined face 25 of the edge on the same second large face 19.

5 A fold 27 also forms a functional means of fixing a hinge element of the pivoting means 8. Indeed, a fold 27 makes it possible to tighten efficiently one (or more) hinge fixing screws 32.

In the embodiment described, the facing 16 has the general shape of a U-shaped tray, while the facing 17 is substantially flat.

10 The panel 7 also includes, fixed on each of its edges 12, an added U section 33.

In the embodiment considered, an edge 14 includes a face 22, 24 inclined between 15° and 25° , in particular at about 20° with respect to the large faces 18, 19. It also includes a
15 face 23, 25 inclined between 40° and 50° , in particular at about 45° on these two large faces 18, 19.

Two adjacent faces of an edge 14, i.e. 22, 23 on the one hand and 24, 25 on the other hand form between them a ridge and a cant or nook respectively 34, 35 of between 150° and
20 160° , in particular of about 155° ,

Where the rounding 21 is concerned, it has a radius of curvature of the order of or less than one tenth of the total thickness of the panel 7.

Two panels 7 such as have just been described are mounted
25 one on the other so as to swivel with respect to each other by pivoting means 8 rigidly associated in the case of one of the panels 7 near its longitudinal protruding edge 14a and in the case of the other panel 7 near its longitudinal recessed edge 14b. This rigid association is provided by
30 means of screws 32. The pivoting means 8 comprise at least

two end hinges 8a towards the side edges 12 and, where appropriate, one or more intermediate hinges 8b. The two elements 36, 37 of each hinge 8 are fixed to the panels 7 at least on the interleaved folds 27. These elements include
5 parts in the form of a plate 38 provided with holes 39 for the shoulder-headed screws 32 and curved parts 40 for housing and fixing a spindle 41 forming the axis 15.

The axis of swivel 15 of the hinges 8, and therefore of the panels 7, is situated outside the outer dimensions of the
10 panels, close to the second large face 19 and to the facing 17 in which is the fold 27, substantially at right angles with the central part of the protruding edge 14a of the first panel 7 and substantially at right angles with the free edge 21 or the recessed edge of the second form when
15 the two panels form a continuous line in the same plane. In figures 7, 8, 9 and 10 the so-called "first" panel 7 is in the lower position and the so-called "second" panel is in the upper position.

More particularly, the axis of swivel 15 is distant from the
20 second large face 19 and from the facing 17 of the first panel 7 by a value of the order of one third, one half or even less of the total thickness of the panel 7.

The two facing longitudinal edges 14a, 14b of the two panels 7 are separated from each other by a small free space 42.
25 The facing longitudinal edges 14 of two adjacent panels are spaced and not interlinked one in the other. This space 42 thus configured and proportioned forms an external guard against pinching of fingers.

The faces 24, 25 of the recessed edge 14b are substantially
30 tangential to an arc of circle with the axis of swivel 15.

The end hinges 8a are fixed on the added sections 33 forming the side edges 12.

5 In one embodiment the door 2 also comprises an internal guard against pinching of fingers 43 in the form of added plates or sections, fixed flat on the second panel 7, on the second large face 19 where the fold 27 is (facing 17). Such a plate or section extends until it is slightly below the axis of swivel 15, when the two panels in question form a line in the same plane.

10 In a variant of this embodiment (figure 7), the plate or section 43 is folded back at 44 to come against the facing 16 of the first panel when the two panels are in line in the same plane.

15 In another embodiment, the internal guard against pinching of fingers 43 is not an added piece fixed flat on the large face of the second panel 7, but is incorporated in the face 19 of facing 17. The large face 19 then extends until it is slightly offset from the central part of the protruding edge 14a of the first panel 7, when the two panels are in line in the same plane (figure 7a).

20 The large face 19 is folded back at 44 to come against the facing 16 of the first panel 7 when the two panels are in line in the same plane, and to form the fold for the second panel 7.

25 One of the two elements of an end hinge 8a, i.e. element 36 for example, has the form of a bracket having on the one hand the plate 38 and on the other hand a lug 45 with an elongated hole 46, extending substantially perpendicularly to the plate in question, in which is fixed rigidly but so
30 as to be adjustable, a spindle 47 supporting the roller 11. The said spindle 47 has, as a transverse cross section a

non-circular, indeed polygonal, profile 48, for the purpose of fixing it in place.

5 The panels 7 thus constituted advantageously have a reduced weight. The same therefore applies to the whole of the leaf 6.

A consequence of this structure is that the cable reel drum can have a reduced diameter, for instance between 65 and 75 mm.

10 The result is that the apron of the lintel and the corner pieces can also be of reduced size, as has already been stated.

15 The door also comprises a lock for example with automatic return, two control rods with ferrules at their extremities which bolt into fixed keepers. On closing, the lock is operated by a handle locked by a key-operated cylinder.

Once the various constituent parts of the door 2 just described have been produced, in particular the panels 7, the parts are assembled and pre-erected.

20 This pre-erection enables two assemblies to be made. A first assembly includes the side guide rails 9, the leaf 6 being positioned between them, the rollers which cooperate with the rails 9, and finally, the mechanism 13. A second assembly includes the upper guide rails 10, and in some cases a cross-piece 49 the purpose of which is to join them.

25

The first assembly 6, 7, 9, 11, 13 is compact and fits within an envelope with the general shape of a flattened parallelepiped. This is because, as has already been stated, this assembly is laterally limited by the rails 9, since the drums 13b do not protruding out of this assembly because they are positioned between the leaf 6 and the rails 9. As

30

regards the cables, they are incorporated in the ironwork of the door 2, i.e. they do not protrude.

5 The first assembly of the door 2 which has just been described is such that it can be pre-adjusted at the time of manufacture. This pre-adjustment applies the length, the positioning and the tension of the cables and of the spring or springs 13c.

10 This structural disposition is advantageous since it gives rise to a quality pre-adjustment at the time of manufacture and avoids tedious, time-consuming or delicate operations on the site of final installation of the door.

The second assembly 10, 49 can be placed flat against the leaf 6 of the first assembly on the side of the second large face 19.

15 Thus the two assemblies just described form a package which can fit within an overall thickness of less than 125 mm, whereas in the state of the art the thickness is closer to and even exceeds 155 mm.

20 Doors 2 as they have just been described are packed by means of the packaging 50.

The packaging 50 includes a support 51 forming a pallet as to its part 52 and a rack as to its part 53.

The rack 53 is able to house a plurality of doors such as just described, placed side by side.

25 The support 51 includes, as regards the part forming the rack 53, two side flanks 54. In addition the packaging 50 also includes, in the embodiment considered, two side flat iron bars 55.

Such a packaging can house up to nine doors each in the form of the package previously described. These doors are placed symmetrically two by two in such a way that the first two large faces 18 or the second two large faces 19 face each other.

When the doors are so arranged, they can be fixed removably by their side rails 9 to the flanks 54 by means of screws.

As to the flat iron bars 55, they are fixed in the same way at the other end of the flanks 54.

10 The support 51 is placed at the bottom, forming a pallet. The flat iron bars are placed at the top.

The overall dimensions of such a packaging comprising nine doors and fitting within a parallelepiped is for example 1.15 m x 3.20 m by 2.60 m in height, or less.

15 Once manufactured the doors are packaged as just described. This packaging can easily be transported given the limited weight of the panels 7. The packaging 50 makes it possible to store the doors awaiting installation in a structure.

20 For this installation, a door is taken from the packaging 50, carried to the site of the structure, the first assembly 6, 7, 9, 11, 13 and the second assembly 10, 49 are positioned and fixed.

Since the door has been pre-mounted during manufacture and pre-adjusted, the installation can be quick.

CLAIMS

1. A sectional door (2) opening against the ceiling and with vertical travel such as a typical garage door, pre-assembled with a view to its installation, capable of being thus stored, delivered and supplied on the installation site, comprising a first assembly (6, 7, 9, 11, 13) including:
- side guide rails (9) positioned vertically when the door is mounted in place
 - a leaf (6) comprising a series of panels (7) and supporting rollers (11) cooperating with the side guide rails (9), each panel capable of being mounted on at least one other analogous panel (7) so that they swivel with respect to each other around an axis parallel to a longitudinal direction (D) normally horizontal when the door is mounted in place, each panel, thin and light, comprising a first and a second facing (16, 17) made from thin sheets of metal or similar, the space closed at the periphery by the two facings being at least partly filled with a synthetic material expanded during manufacture
 - a shaft (13a) positioned longitudinally towards one extremity of the side guide rails (9)
 - one or two cable reel drums (13b) key mounted on the extreme parts of the shaft (13a) towards the outside of the leaf and between the leaf and the side rails (9)
 - one or two cables connected on the one hand to the leaf (6) of the lower end panel, on the other hand wound on to the cable reel drum(s) (13b), these cables being thus not subject to unauthorised access
 - one or more pre-stretched elastic return elements mounted on the shaft, such as a spiral spring
 - manual or motorised means for manoeuvring the leaf; the said first assembly (6, 7, 9, 11, 13) being pre-assembled

and pre-adjusted with a view to the installation of the door;

the door comprising a second assembly (10, 49) including the upper guide rails (10).

5

2. A door according to claim 1, characterised in that the mass of each thin, light panel of the leaf is of the order of 9 to 10 kg/m², more particularly about 9.5 kg/m².

10

3. A door according to claim 1 or 2, characterised in that the total thickness of each thin, light panel of the leaf is less than 3 cm.

15

4. A door according to any of claims 1 to 3, characterised in that the second assembly comprises a crosspiece intended to connect the upper guide rails when the door is mounted in position.

20

5. A door according to any of claims 1 to 4 characterised in that the second assembly (10, 49) is placed flat against the leaf of the first assembly, the two assemblies together forming a package.

25

6. A door according to any of claims 1 to 5 characterised in that the pre-adjustment of the first assembly relates to the length, the positioning and the tension of the cables and of the spring(s) (13c).

30

7. A packaging (50) for a sectional door opening against the ceiling and with vertical travel as described in claims 1 to 6, characterised in that it includes a support (51) forming a pallet and a rack (53) capable of housing a number of doors placed side by side.

8. A packaging according to claim 7, characterised in that the support (51) comprises two side flanks (54) to which are removably fixed the side guide rails (9), and if appropriate:

- 5 - two flat iron bars (55) to which are removably fixed the side guide rails (9) at the other end of the flanks (54)
- and/or a metal profile removably fixed under the side guide rails (9) enabling each door to be protected during transport and the distance between the side flanks (54) to
- 10 be maintained.

9. A packaging according to claim 8, characterised in that it can contain up to 9 doors.

- 15 10. A method of installation in a structure provided with an opening of a door opening against the ceiling and with vertical travel, as described in claims 1 and 6, if appropriate packaged according to any of claims 7 to 9, characterised in that the manufactured, pre-assembled and
- 20 pre-adjusted door is taken to the site of the structure where the first and second assemblies are positioned and fixed to the said structure.

- 25 11. A sectional door opening against the ceiling and with vertical travel, such as a typical garage door, intended to be installed in the opening of a construction, comprising:
 - side guide rails (9) and upper guide rails (10);
 - a leaf (6) comprising a series of panels (7) and supporting rollers (11), each panel capable of being mounted on at
 - 30 least one other analogous panel (7) so that they swivel with respect to each other around an axis parallel to a longitudinal direction (D) normally horizontal when the door is mounted in place, each panel, thin and light, having a first and a second facing (16, 17) made from thin sheets of

- metal or similar, the space closed at the periphery by the two facings being at least partly filled with a synthetic material expanded during manufacture; the rollers (11) being intended to cooperate with the side rails (9) and the upper rails (10) to guide the leaf correctly;
- a shaft (13a) positioned longitudinally towards the junction of the side rails and the upper rails;
 - one or two cable reel drums (13b) mounted on the extreme parts of the shaft towards the exterior of the leaf and between the latter and the side rails;
 - one or two cables connected on the one hand to the leaf to the lower end panel and on the other hand wound on to the cable reel drums;
 - one or more pre-stretched resilient return elements (13c) mounted on the shaft, such as a spiral spring
 - manual or motorised manoeuvring means;

12. A door according to claim 11, characterised in that the mass of each thin, light panel of the leaf is of the order of 9 to 10 kg/m² and more particularly about 9.5 kg/m², and the total thickness of each thin, light panel of the leaf is less than 3 cm.

13. A door according to claim 11 or 12, characterised by one or more cable reel drum(s) of reduced diameter, such as between 65 and 75 mm.

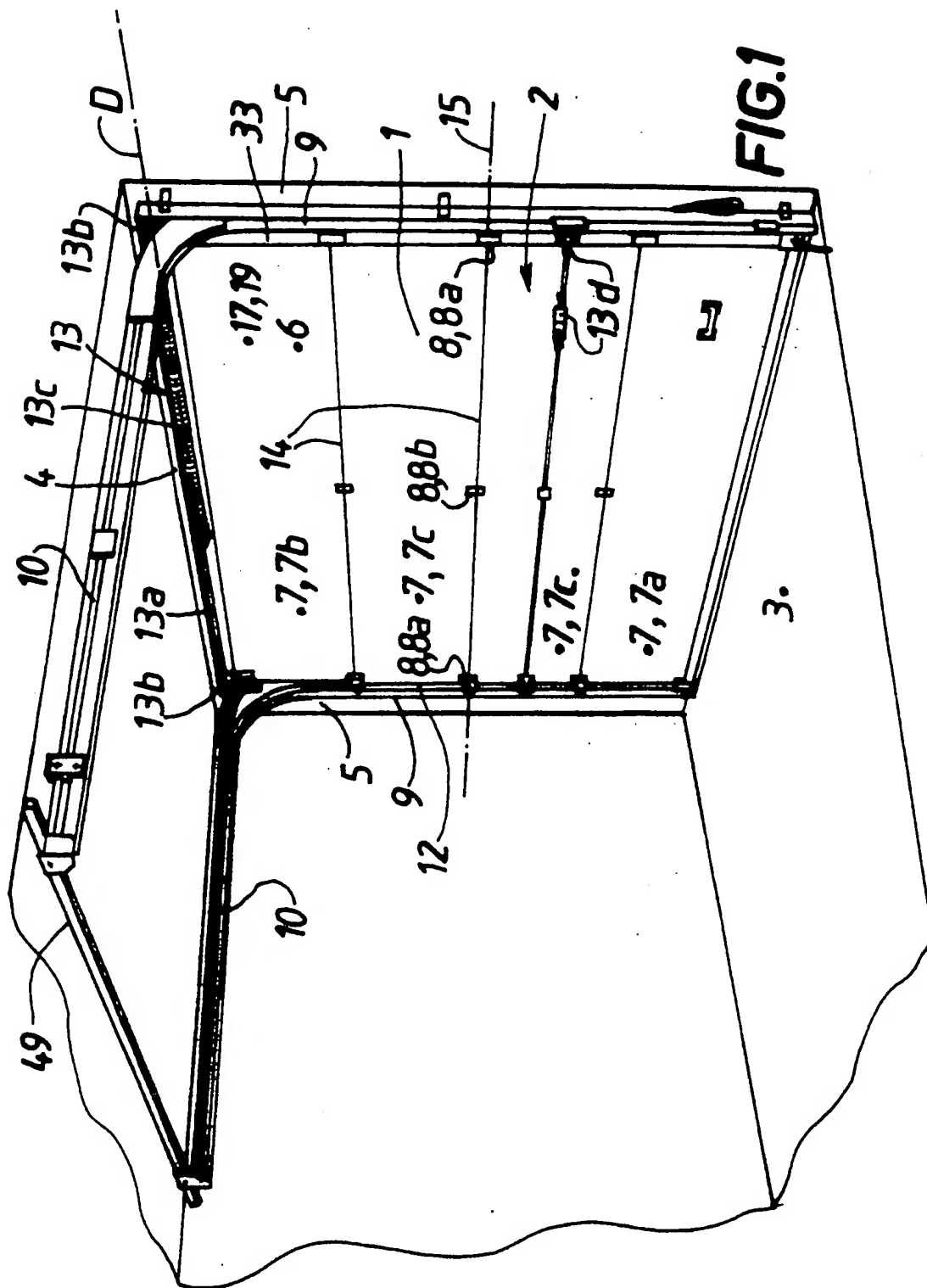
14. A construction comprising an opening in which is installed a sectional door opening against the ceiling and with vertical travel according to any of claims 11 to 13.

15. A construction according to claim 14, characterised by a lintel apron and two corner pieces of reduced size, such as

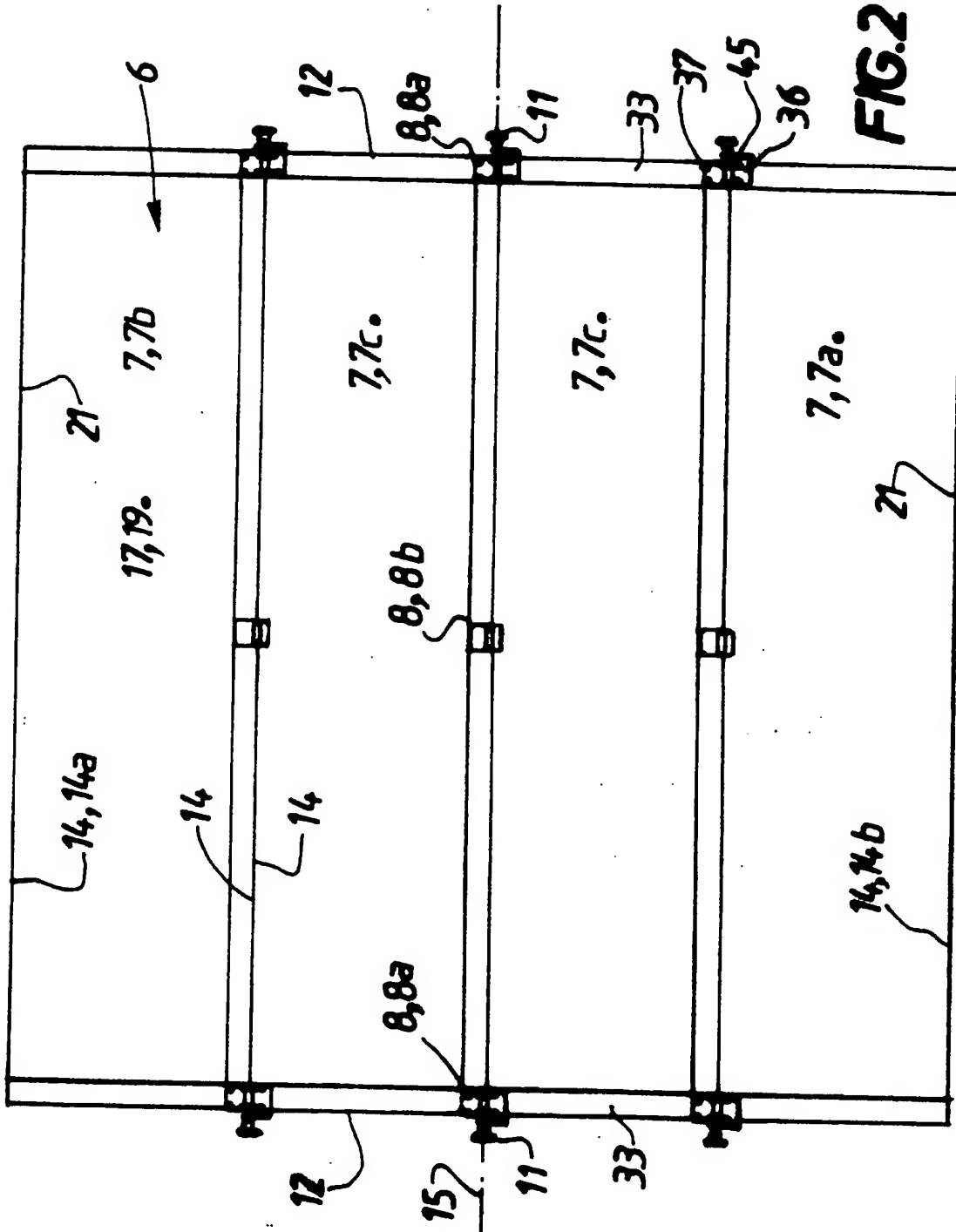
being capable of being less than 10 cm, more particularly of the order of 8 cm and of the order of 9 cm respectively.

- 5 16. A construction according to any of claims 14 or 15, characterised in that the upper guide rails and the hinges are positioned on the inside and the longitudinal ribs or the cassettes on the outside.

1/12



2/12



3/12

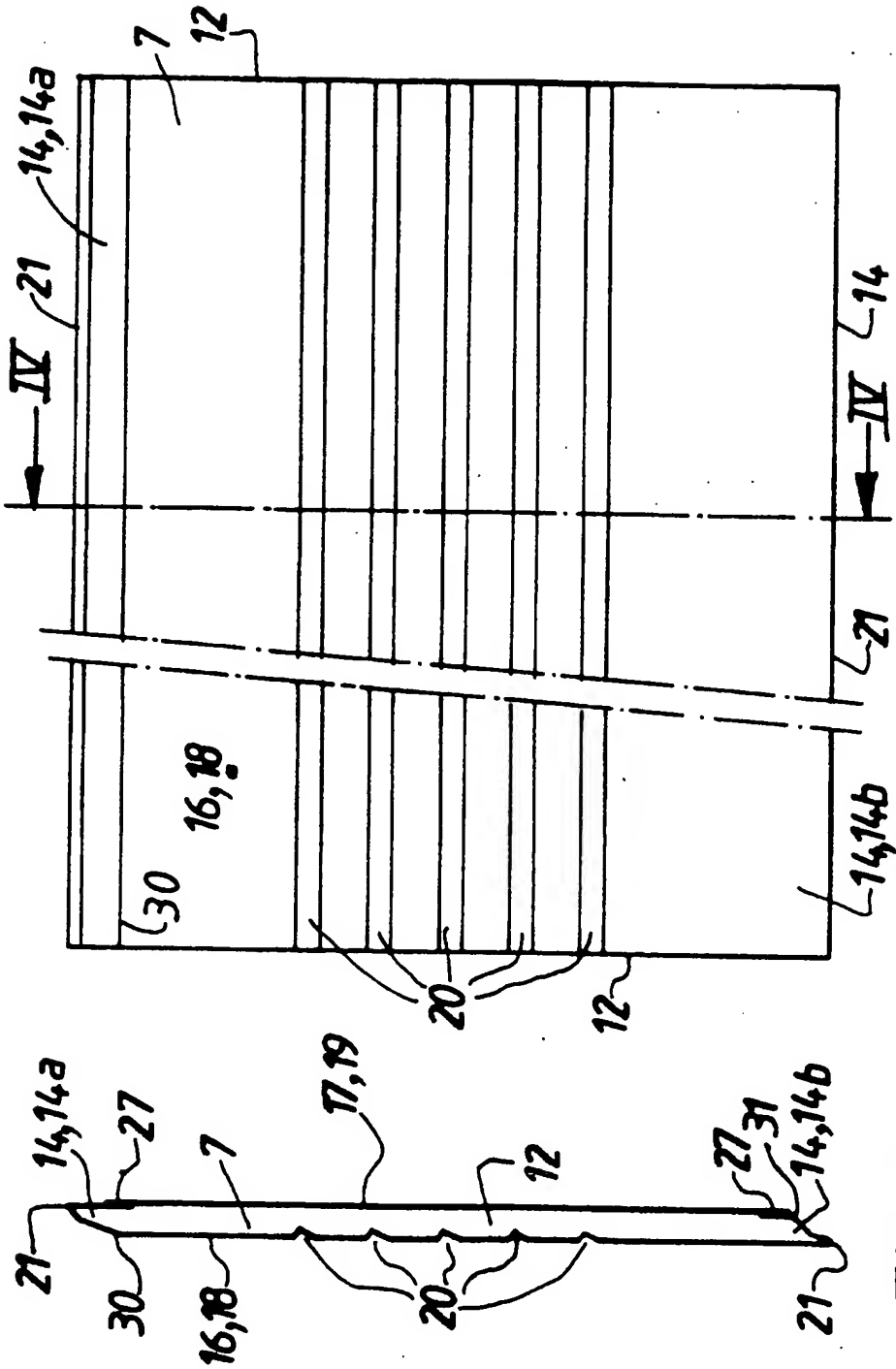


FIG. 3

FIG. 4

4/12

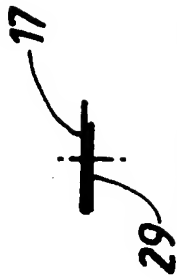


FIG. 6B



FIG. 5B

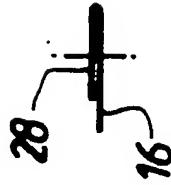
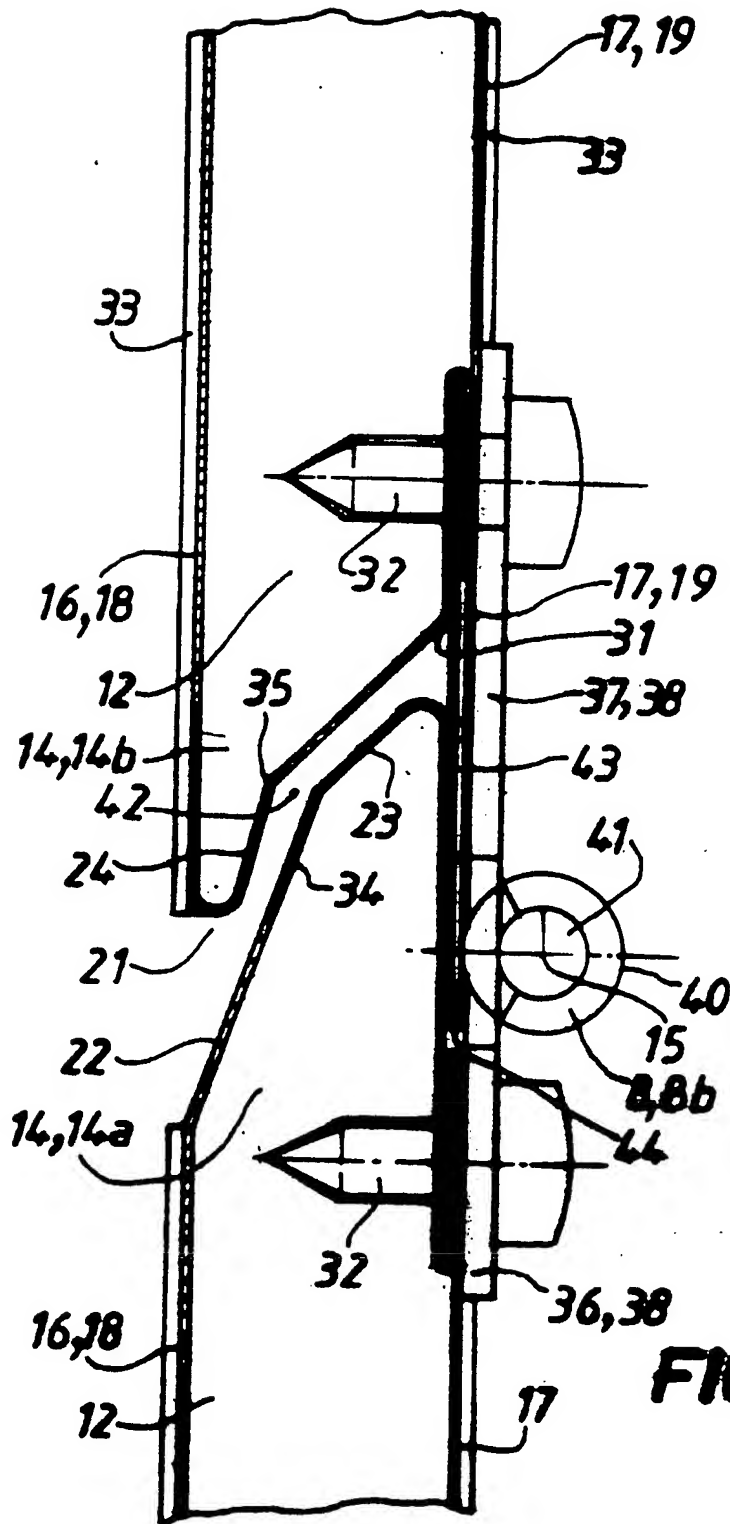


FIG. 6A

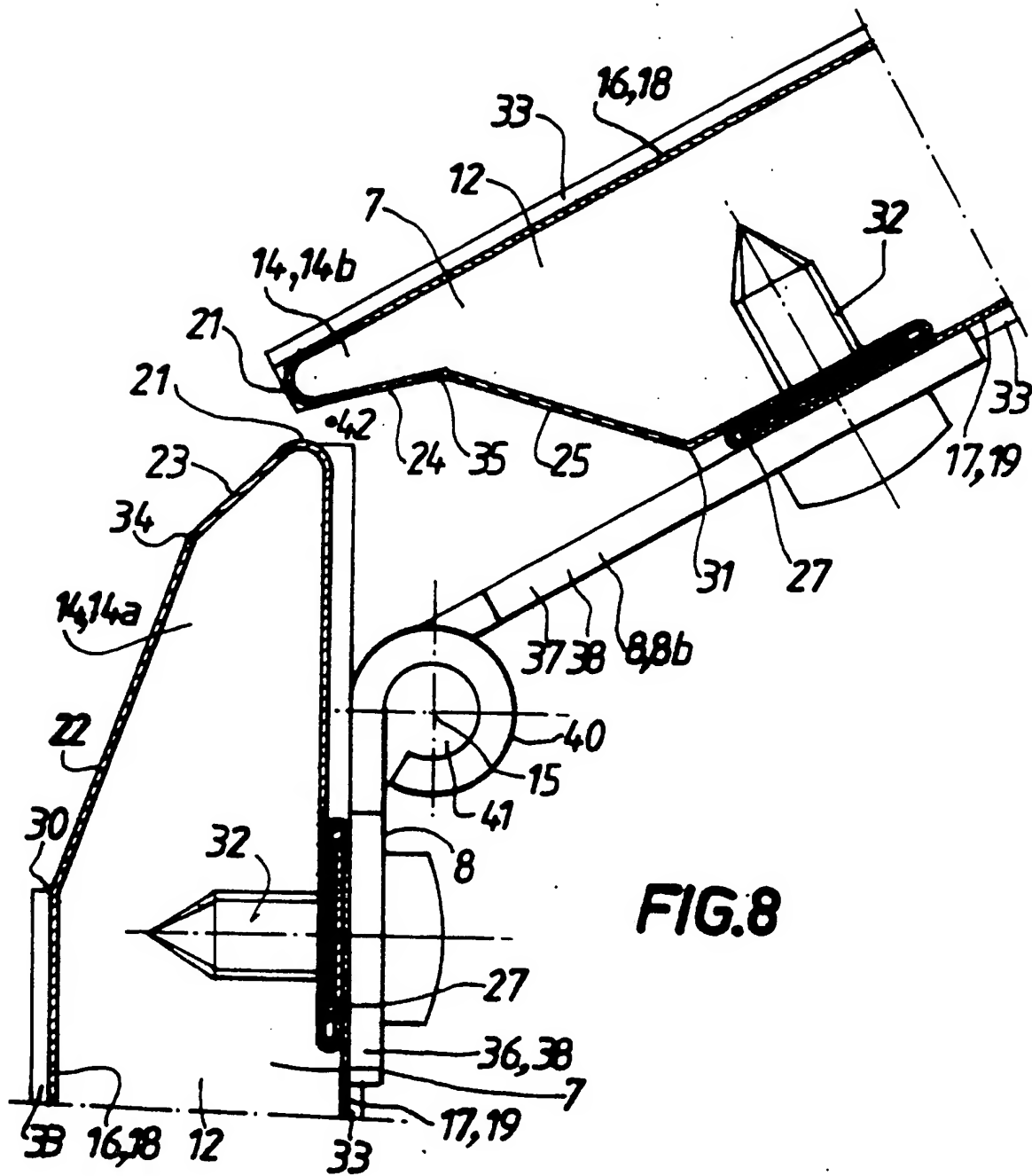


FIG. 5A

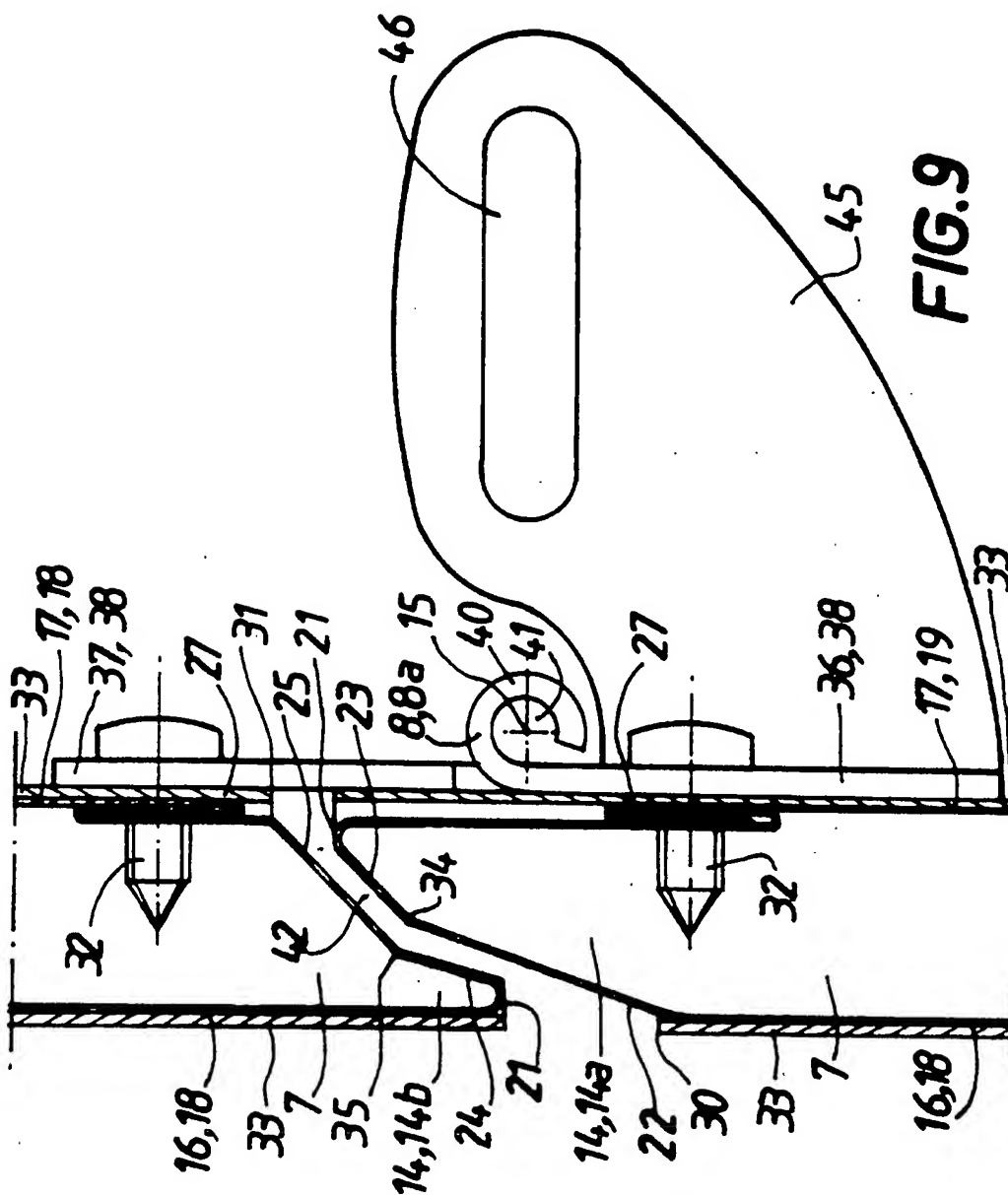
6/12



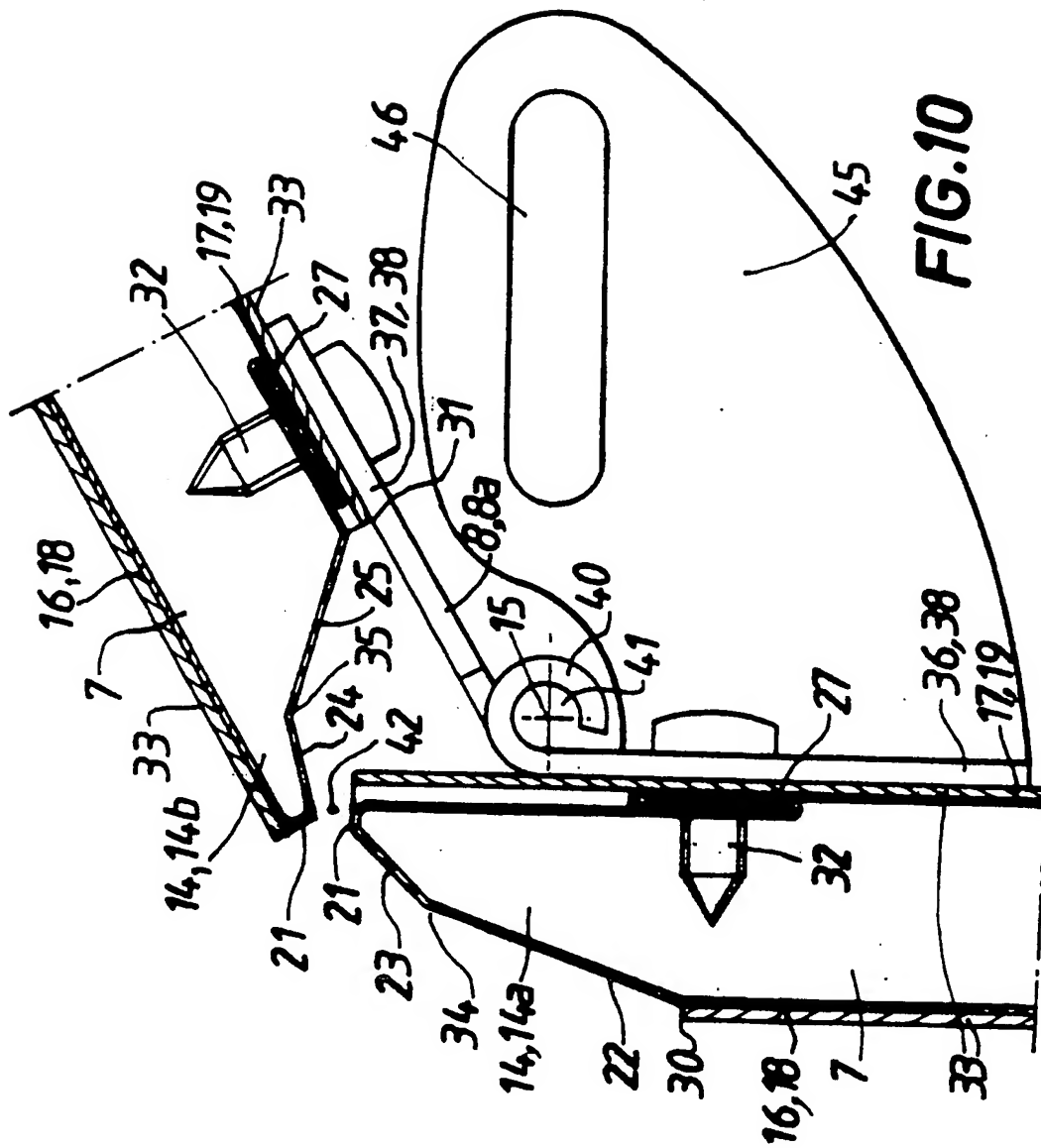
7/12



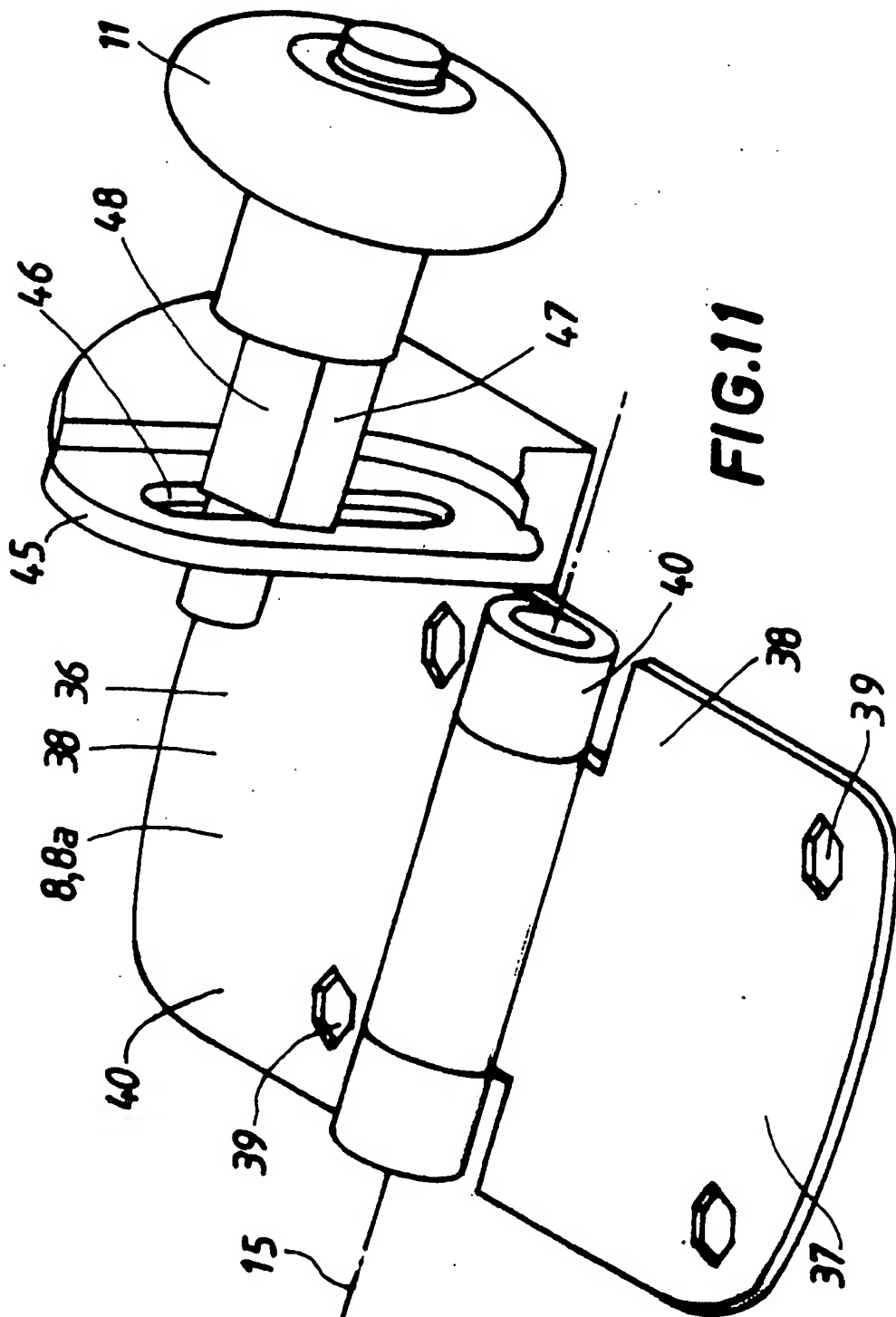
8/12



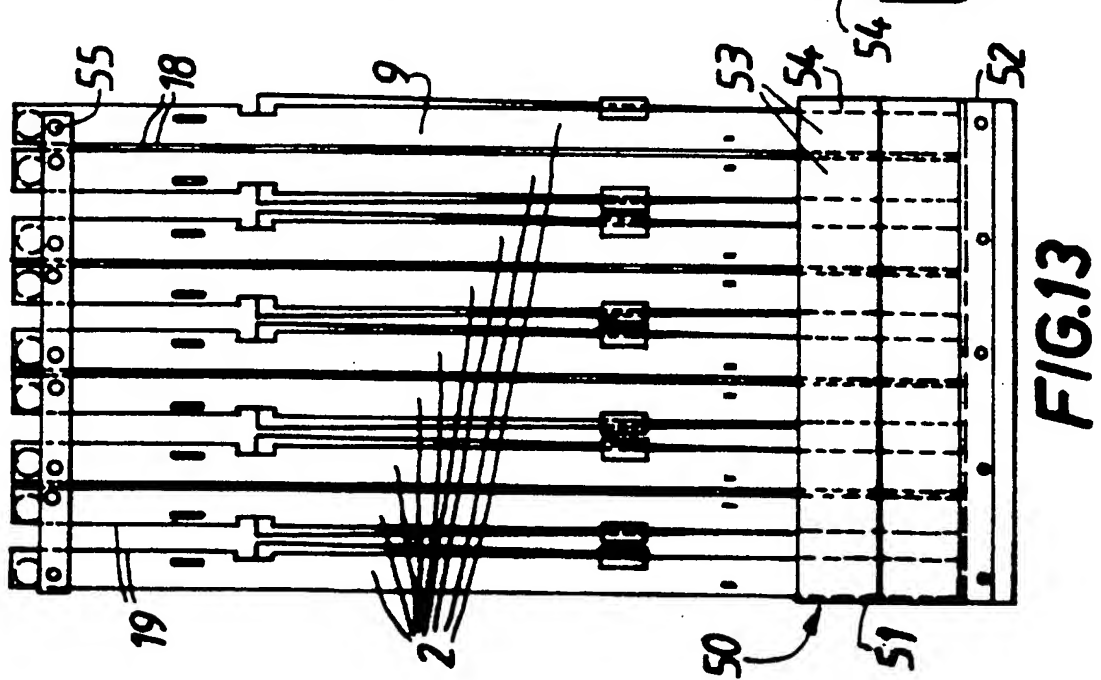
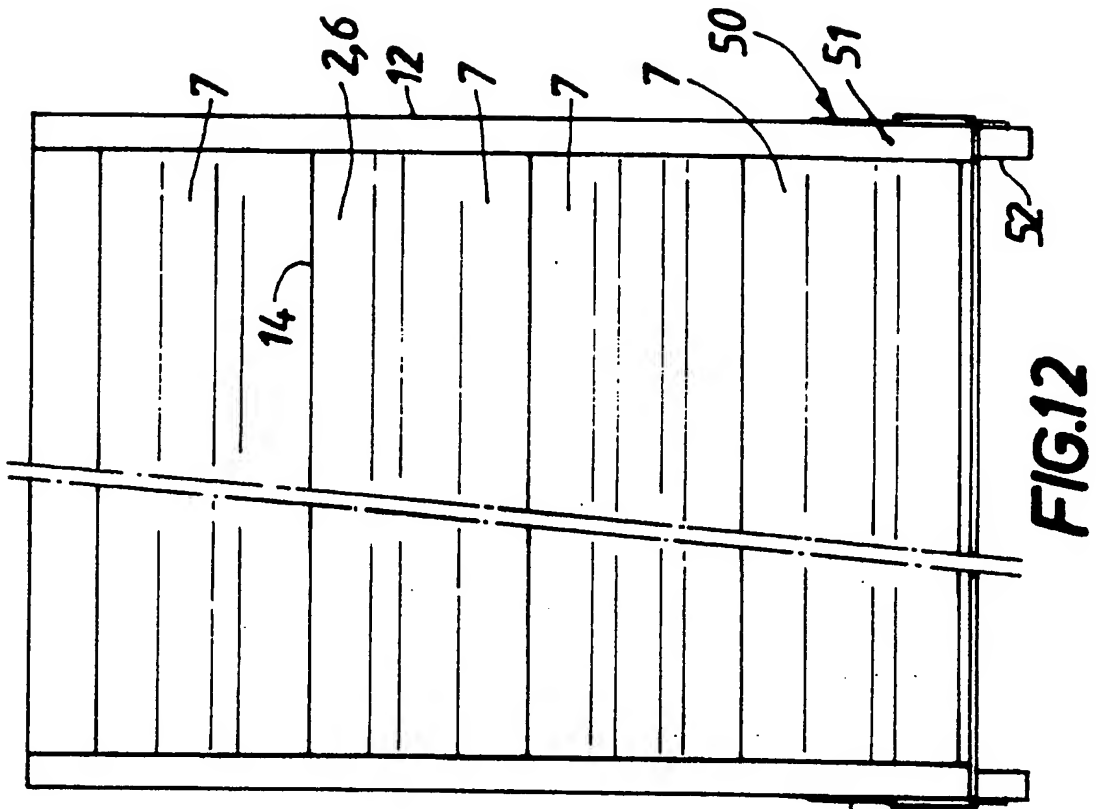
9/12



10/12



11/12



12/12

